

MANUFACTURER



FAGOR AUTOMATION

CNC 8065 / 8060



Leading-edge technology at your fingertips

The FAGOR CNC 8065
and 8060 are the most
technologically advanced solutions
tailored to customer needs



Open solution

FAGOR CNC's can be easily adapted to excel with all customer applications through the integration of customized machining cycles, creation and modification of graphic interface and the integration of third-party software, etc.

Flexible solution

FAGOR AUTOMATION offers solutions that can be adapted to any machine configuration, along with the required peripherals for each application: keyboards, screens, remote terminals and external sensors, etc.

Robust solution

Products developed by FAGOR AUTOMATION have been designed to operate with the utmost efficiency under the toughest of industrial environments. They are robust, ergonomically designed and ensure the highest guarantees in terms of protection for industrial environment.

New state-of-the-art peripherals best-configured for the industry



Panel PC's and touch screen monitors

FAGOR CNC's can be equipped with four different size touch screen monitors: 10.4", 15", 19" and 21.5" widescreen.

These highly sensitive touch screen monitors do not require the use of an optical pen and may even be operated with gloves. They allow easy access to numerous easy and efficient advanced navigation functions.

The interface of these new monitors may be customized according to the specific needs of each customer.

With the use of new technologies and materials, the FAGOR AUTOMATION touch screen monitors are suitable for even the toughest industrial environments, as they are extremely robust, easy to clean and scratch resistant.

The 19" Panel PC's and 21.5" widescreens are smart monitors that have a unique dual CPU operating system. This system helps streamline machining operations while offering higher processing speeds and more data storage capacity. It also allows for easy customization of user interfaces and displays, and integration of any special application features.



Reliable, agile and ergonomic keyboards

The latest keyboards have been exclusively designed by FAGOR AUTOMATION, based on the needs of different users. These keyboards enhance speed while providing complete reliability in industrial settings and also optimizing machining operations and programming tasks.

By introducing new technologies and more durable materials, FAGOR has improved the ergonomics of physical keyboards (non-membrane keys), which significantly enhances the texture and the typing speed.

Keyboards have a built-in multi-touch (pinch and expand) touchpad, allowing the user to navigate via the monitor, with advanced functionalities while using the mouse (scrolling, zooming, etc.).



Wireless handwheels and remote terminals

FAGOR AUTOMATION's handwheels and remote terminals are wireless, lightweight, ergonomic and very simple to use.

These remote terminals allow for the direct access to advanced CNC features. Their graphic interface, being similar to that of the CNC 8065, incorporates a touch screen and various controls, such as navigation keys and specific buttons for the selection of axes or active modes.

MILLING MACHINES

For the most complex profiles and shapes
or simple conventional milling

High precision milling applications: 5 axes, bridge milling machines, boring mills, etc.



5-axis machining

FAGOR CNC's operate machines with a large variety of kinematics and can be combined with continuous 5-axis interpolation, providing high-quality part finishing.

They also allow for machining with inclined planes, without having to relocate the part. Once the tool has been manually or automatically oriented, it is sufficient to define the inclined plane and thus execute many different types of machining operations, pockets, rotations, etc. with ease.

HSSA machining system

For the machining of molds, the HSSA (High Speed Surface Accuracy) machining system optimizes the set of points gathered from the Cad-Cam and smooths out the tool paths by creating polynomials (Splines).

This system helps achieve high-quality part finish and jerk-less high-speed machining, thus reducing mechanical vibrations and also significantly reducing machine mechanical stress hence ensuring a long machine life.



Dynamic override

When the setup of a machine has been completed, the operators will very often not know the "best fit" machining parameters needed to achieve the required finish and the machining time.

The mass/weight of the part, high speed machining sequence, the material removal sequence and tooling choices- all have an impact on the behavior of the machine and can cause vibrations that ultimately affect part quality.

The FAGOR Dynamic Override system is a way to optimize the cutting conditions "instantly" while machining the component. Through the use of a simple bar, the user can improve machine behavior by reducing vibrations, while maintaining the programmed speed and yet still be able to achieve a high-quality part finish.





Machining of molds, inclined planes, high speed, etc.



Simple machining for short runs

Kinematics calibration

Set-up of 5 axis machines also requires kinematics calibration. Over time machine dynamics change due to various reasons: temperature fluctuations, wear and tear, failure of mechanical parts etc., this affects machine kinematics and they need to be recalibrated.

An HMI has been developed for this process, so that it is simple and intuitive. This process is integrated in the CNC 8065. The user only has to input few data, and the CNC will automatically calculate the new parameter values.

Volumetric compensation

For industries, such as in Aerospace machining the traditional compensation methods are not adequate.

After performing a 3D laser measurement on the machine, the FAGOR volumetric compensation simultaneously makes corrections for 21 separate parameter tables. These tables list the translation, rotation and geometric errors for the entire machine.

This functionality significantly improves the machine precision, achieving up to 80% better accuracy after the compensation is applied.

Dynamic machining control

This is a control system that optimizes machining speed, while maintaining mechanical integrity and those of the tools being used.

The CNC analyzes the machining conditions (power consumed, tool tip temperature, etc.) and automatically adapts both the axis feed rate and the spindle rpm for machining under optimum conditions in order to achieve maximum productivity.

There are two methods of programming the machining feed rate:

- Prioritizing the surface finish.
- Prioritizing the machining time.

LATHE

From the most complex machining
to the simplest

High complexity lathes: 5 axes, multi-channel, vertical...



5-axis machining

Like the mill, FAGOR's CNC lathe models can manage all types of turning kinematics and combined with RTCP (Rotation Tool Center Point) interpolation, provide high-quality finished parts. The user programs the actual part and the CNC adapts the movement of the tool center point (always keeping it normal to the machining plane) to continuously compensate the tool position while machining.

Dual-purpose machine (Lathe-Mill)

FAGOR CNC's also allows for the selection of a milling or lathe interface on machines that combine both functionalities without having to restart the machine.

By simply pressing a key or using a command in a program, it is possible to select the interface depending on the operation to be performed.

Multi-channel lathe

The multi-turret lathes can almost double machine productivity, while significantly reducing machining time. FAGOR has developed specific functions such as "Dynamic distribution machining - DYNDIST", which allows the part to be programmed in a single channel (as if machine is a single turret lathe) and the CNC is assigned to distribute or synchronize the machining sequence with the other channel automatically.



Production Lathes: Optional C-axis and Y-axis*Simple machining for short runs*

Milling cycles on a lathe

The FAGOR 8060 and 8065 models offer a wide range of predefined cycles for milling on a lathe while working with the C and the Y-axis. In addition to having all cycles of the milling machine available for drilling, threading, etc., the user may also easily program irregular or regular shaped pockets and repeat these utilizing a predefined positioning pattern.

Thread repair

For previously machined threads that may have been worn or damaged, FAGOR offers a machining cycle that allows for complete or partial repair of the thread, thus the ability to repair the existing part without having to machine a new part. This functionality is available for single or multi start -threads, including taper threads.

Standard threading cycles

FAGOR offers a wide range of standard cycles that are focused on the oil sector, so as to facilitate the programming of parts such as:

M (S.I.) Regular pitch metric thread (international system).

M (S.I.F.) Fine pitch metric thread (international system).

B.S.W. (W) Regular pitch Whitworth thread.

B.S.F. Fine pitch Whitworth thread.

U.N.C. Regular pitch unified American thread.

U.N.F. Fine pitch unified American thread.

Optimizing machine efficiency

Optimization tools

FAGOR AUTOMATION includes a wide range of calibration tools as standard on all CNC controls: such as an On-board Oscilloscope, a Bode diagram and the Finetune software feature. They all greatly assist in simplifying the complex CNC setup procedures.

Set-up wizard

Fagor Automation offers a quick set-up wizard for easier integration of its complete system hence substantially reducing the machine build-time. Based on the machine configuration the OEM is guided through automatic selection of PLC program and some basic machine parameter allowing the operator to move the axes instantaneously.

Auto adjustment of axis (Finetune software)

The Finetune program automatically optimizes the various servo control loops of the machine to obtain the highest performance as demanded by the machine manufacturers. Combining the set-up wizard with Finetune provides the following benefits:

- A big reduction in machine set up time.
- Reduce set up time minimizes machine tool production costs.
- Better quality axis and spindle adjustment.
- The intuitive auto-tuning software doesn't require any specialized skills.
- It prevents and eliminates mistakes that normally occur during manual adjustment process.
- Achieving optimum adjustment greatly enhances the life of machine's mechanical components.
- The simplicity of auto-tune software allows the user to tweak it's performance as the machine dynamics change over prolonged usage.

Bode diagram

Is a tool for determining the machine's frequency response. With this information, it becomes possible to filter vibrations produced from the resonance of mechanical design of the machine, thus allowing the machine builder/user to obtain best adjustment and stability.

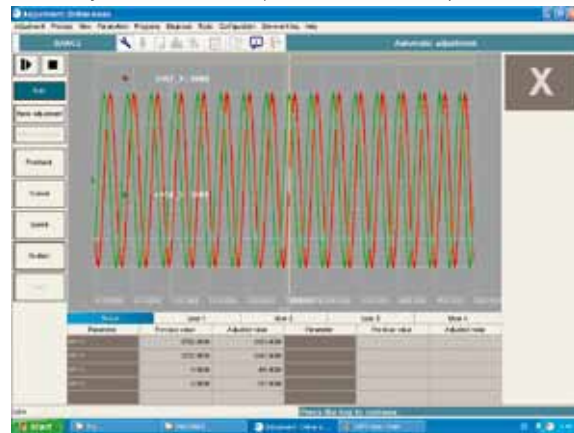
Circularity (roundness) test

Helps improve the behavior of the axes when reversing their moving direction. When executing a circle, the feature graphically compares the actual path with the theoretical path and then provides the necessary tools for the correct adjustment.

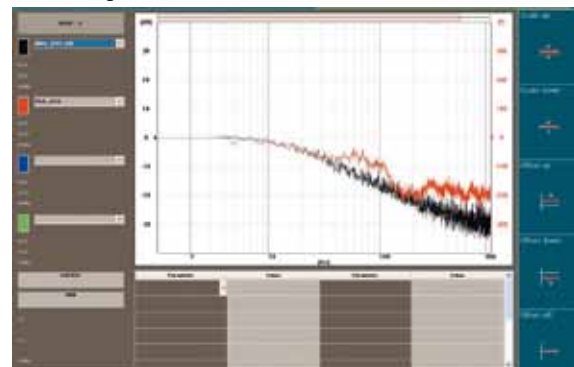
Oscilloscope

The oscilloscope feature is a tool which provides assistance when adjusting the axes performance. It allows the ability to display and correct the machine performance and dynamic behavior with the help of 4 work channels which show both analog and digital variables.

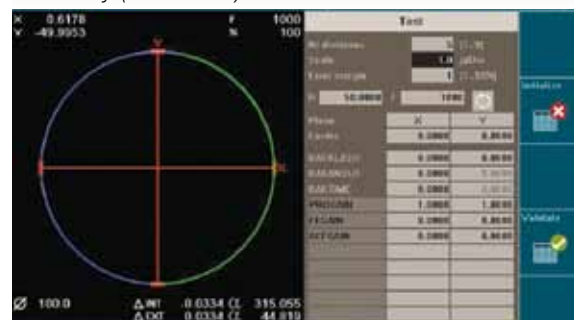
Auto adjustment of axis (Finetune software)



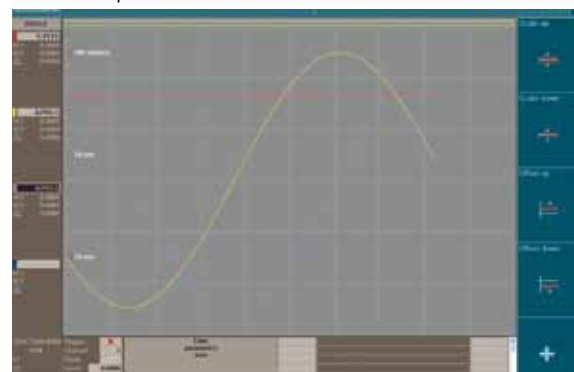
Bode diagram



Circularity (roundness) test



Oscilloscope



Maintenance tools

Tele-diagnosis



Tele-diagnosis

The CNC 8060 offers tele-diagnosis software as standard allowing the OEM to connect to the machine user via internet to inspect, troubleshoot and repair the machine tool.

This feature allows the machine builder to provide quick technical assistance without having to send a technician to user's site hence eliminating unnecessary and expensive travel in many cases.

Incidence alert



Incidence alert

Machining of large complex parts or batch production takes a long time and doesn't require operator presence at all times. Under such circumstances an incidence may occur which could prevent the machine to continue working, affecting productivity.

The "Process Informer" feature can send text messages (SMS) and emails informing the machine user it's status hence allowing him to take immediate corrective action.

CNC simulator for PC



CNC simulator for PC

The CNC simulator provides the machine user a complete tool for programming the entire part from any external PC, comfortably and productively. The manufacturer can provide another functionality for this tool, since it can load the configuration from any of its machines and develop new functionalities or diagnose issues arising in the field, while working as the proper machine.

OEM integrated documentation



OEM integrated documentation

The machine manufacturers can enter their own PLC messages to warn the operator about preventive and maintenance measures.

The PLC messages may refer to maintenance manuals, text files, photos or even videos. This feature helps to reduce the OEM's maintenance tasks while minimizing machine idle time since the user has access to all the necessary information to resolve the problem.

Integrated documentation



Integrated documentation

The FAGOR CNC's provide the operating and programming manuals in the language selected by the user. Pressing the HELP key, the CNC automatically displays the chapter related to the operation being carried out at the time.

Once inside the manuals, it is possible to consult any other information by browsing through the various chapters.

Having the manuals available at the CNC saves time and space, is more environmentally sustainable, makes accessing the information faster and avoids having to utilize paper documents around the machine.

Technical characteristics

	CNC 8065 POWER	CNC 8065	CNC 8060 POWER	CNC 8060 FL
Hardware				
LCD monitor	10.4", 15", 19" y 21.5"	10.4", 15", 19" y 21.5"	10.4"	10.4"
LCD monitor with touch screen	Δ	Δ	Δ	-
Mouse integrated into the keyboard	Δ	Δ	-	-
Spindle override potentiometer	Δ	Δ	-	-
Basic axis configuration	5	3	3	3
Maximum axis configuration	31	8	6	4
Maximum configuration of interpolated axes	31 (*)	8 (*)	4	4
Maximum configuration of spindles	6	2	3	2
Maximum configuration of execution channels	4	2	2	1
User memory	From 2 Gb to 30 Gb	From 2,3 Gb to 30.3 Gb	Minimum 800 Mb	Minimum 800 Mb
Memory expansion via Compact Flash	-	-	• (**)	• (**)
Ethernet	•	•	•	•
USB connections	5	5	2	2
Block processing time	0.167 ms	0.25 ms	1 ms	2 ms
Maximum local digital I/O	8/8 (***)	8/8 (***)	16/8	16/8
Maximum remote digital I/O expansion	1024/1024	1024/1024	1024/1024	1024/1024
Digital servo drives	•	•	•	MAB
Analog servo drives	Δ	Δ	Δ	Δ

Standard features

Look-ahead blocks	2400	1200	300	100
Maximum number of tools	1000	1000	1000	1000
Languages supported	12 (****)	12 (****)	12 (****)	12 (****)
Serial line that may be configured as RS232, RS422 or RS485	•	•	Δ	Δ
IEC-61131 programming language	Δ	Δ	-	-
Dynamic RTCP (spindle, table, combined)	Δ	Δ	Δ	-
Tangential control	•	Δ	-	-
Third-party kinematics	•	•	•	•
Kinematics calibration	Δ	Δ	-	-
Dynamic override	•	•	•	•

Setup tools

Finetune software (Auto-adjustment)	•	•	•	•
Bode diagram	•	•	•	•
Oscilloscope	•	•	•	•
Logic analyzer	•	•	•	•
Tele-diagnosis (Remote Service Assistance)	•	•	•	•
Bidirectional ball screw compensation	•	•	•	•
Cross compensation	•	•	•	•
Volumetric compensation FVC	Δ	-	-	-
Gantry axes	•	•	•	•
Tandem axes / spindles	•	Δ	Δ	Δ
Combined feedback	•	•	•	•
Machining time estimate	•	•	•	•
3D simulation	•	•	•	•
HD graphic simulation	•	Δ	Δ	-
CNC simulation software for PC (Offline simulator)	•	•	•	•

	CNC 8065 POWER	CNC 8065	CNC 8060 POWER	CNC 8060 FL
Adaptation to the machine				
Work in non-orthogonal planes	•	•	•	•
Open system	Δ	-	-	-
Customizable interface	•	•	•	•
OEM/user cycles	Δ	Δ	Δ	Δ
Infinite rotary axis	•	•	•	•
Independent channel axes	•	•	•	•
Axis parking	•	•	•	•
Multi-axis management	•	•	•	•
Electronic cams	Δ	Δ	Δ	-
Polynomial interpolation	•	•	•	•
Number of probes (switching)	2	2	2	2
Hirth axes	•	•	•	•

PLC

Inputs/Outputs	1024/1024	1024/1024	1024/1024	1024/1024
Marks	8192	8192	8192	8192
Number of PLC messages	1024	1024	1024	1024
Number of PLC errors	1024	1024	1024	1024
Registers	1024	1024	1024	1024
Timers	512	512	512	512
Counters	256	256	256	256
Spindle control via PLC (positioning, oscillation)	•	•	•	•

Programming / Browsing

Pop-up browsing	•	•	•	•
Simultaneous execution and simulation	•	•	•	•
Program encryption	•	•	•	•
Coordinate system rotation	•	•	•	•
Manual intervention during machining	•	•	•	•
Selection of active kinematics by program	•	•	•	•
Acceleration with jerk control	•	•	•	•
Automatic gear management	•	•	•	•
Spindle orientation	•	•	•	•
Interruption subroutines	•	•	•	•
Routine interruption, max.	4	4	4	4
Subroutine levels, max.	20	20	20	20
Feed rate override	0...255%	0...255%	0...255%	0...255%
Max. feed rate (mm/min):	500000	500000	500000	500000
Maximum spindle speed	200000	200000	200000	200000
Spindle speed override	0...255%	0...255%	0...255%	0...255%
Spindle ranges (gears)	4	4	4	4
Spindle synchronization	Δ	Δ	Δ	-
Dynamic distribution of machining operations between channels	Δ	-	-	-

- Not available.

• Standard

Δ Optional

(*) Products manufactured by FAGOR AUTOMATION since April 1st 2014 will include “-MDU” in their identification if they are included on the list of dual use products according to regulation UE 428/2009 and require an export license depending on destination.

(**) Use SLC Industrial Grade Compact Flash. Fagor Automation shall not be held responsible for any problems caused by using other lower-quality compact flash devices.

(***) The 8 digital outputs may be configured as inputs via machine parameter.

(****) English, Spanish, Italian, German, French, Basque, Portuguese, Chinese, Russian, Czech, Korean and Dutch.

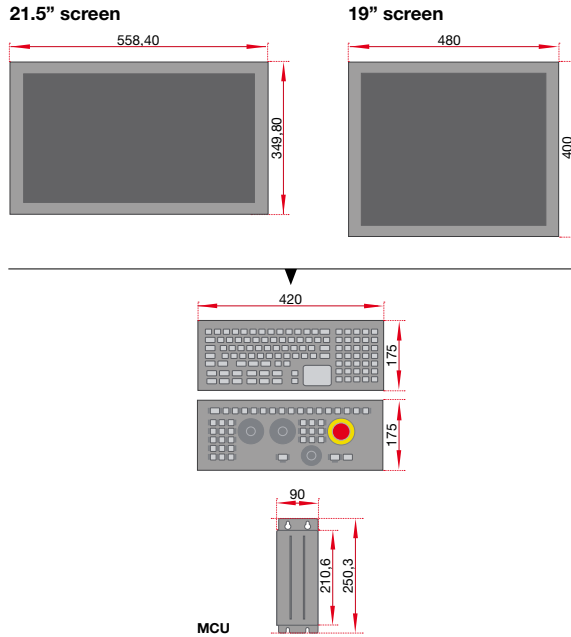
Configuration

CNC 8065

Customized solutions.

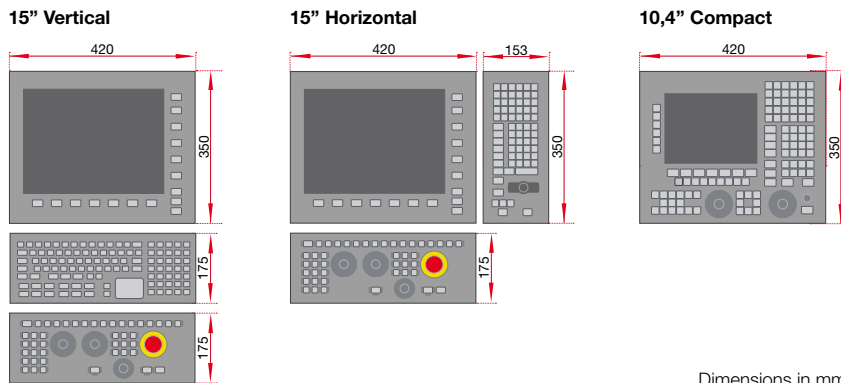
FAGOR allows users to configure an open and flexible solution that best suits their needs: there is a choice of two monitor sizes (19" and 21.5" widescreen).

In addition, it is possible to connect other brand monitors and keyboards to the CNC equipment.



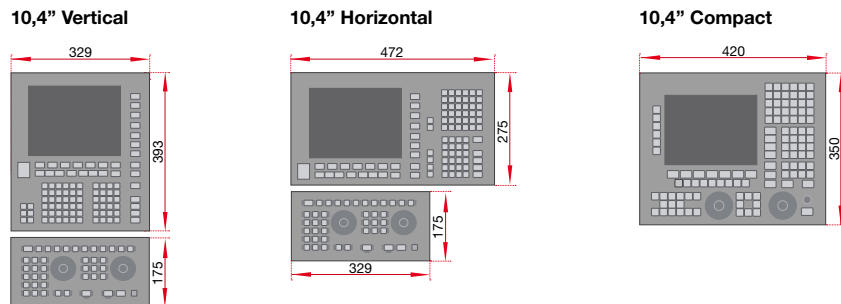
Integrated solutions.

All models have a central unit integrated into the monitor, with a 15" or 10.4" screen.



Dimensions in mm

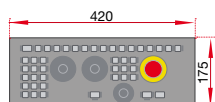
CNC 8060



Optional for both models.

FAGOR operator panel (JOG) with E-stop button and spindle potentiometer.

There is the possibility of adding 3rd party operator panels to the equipment.



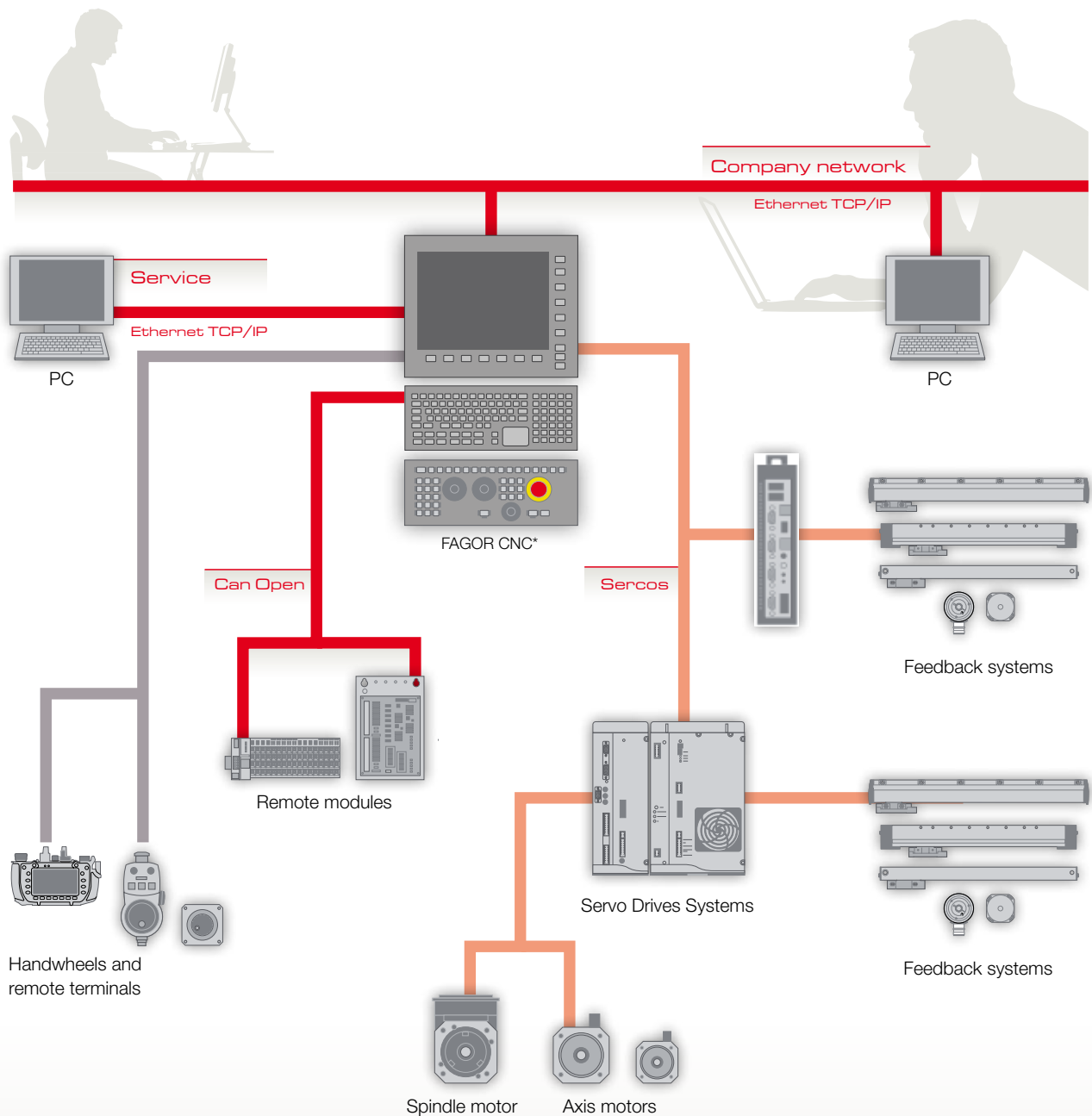
Dimensions in mm

Completely integrated solution

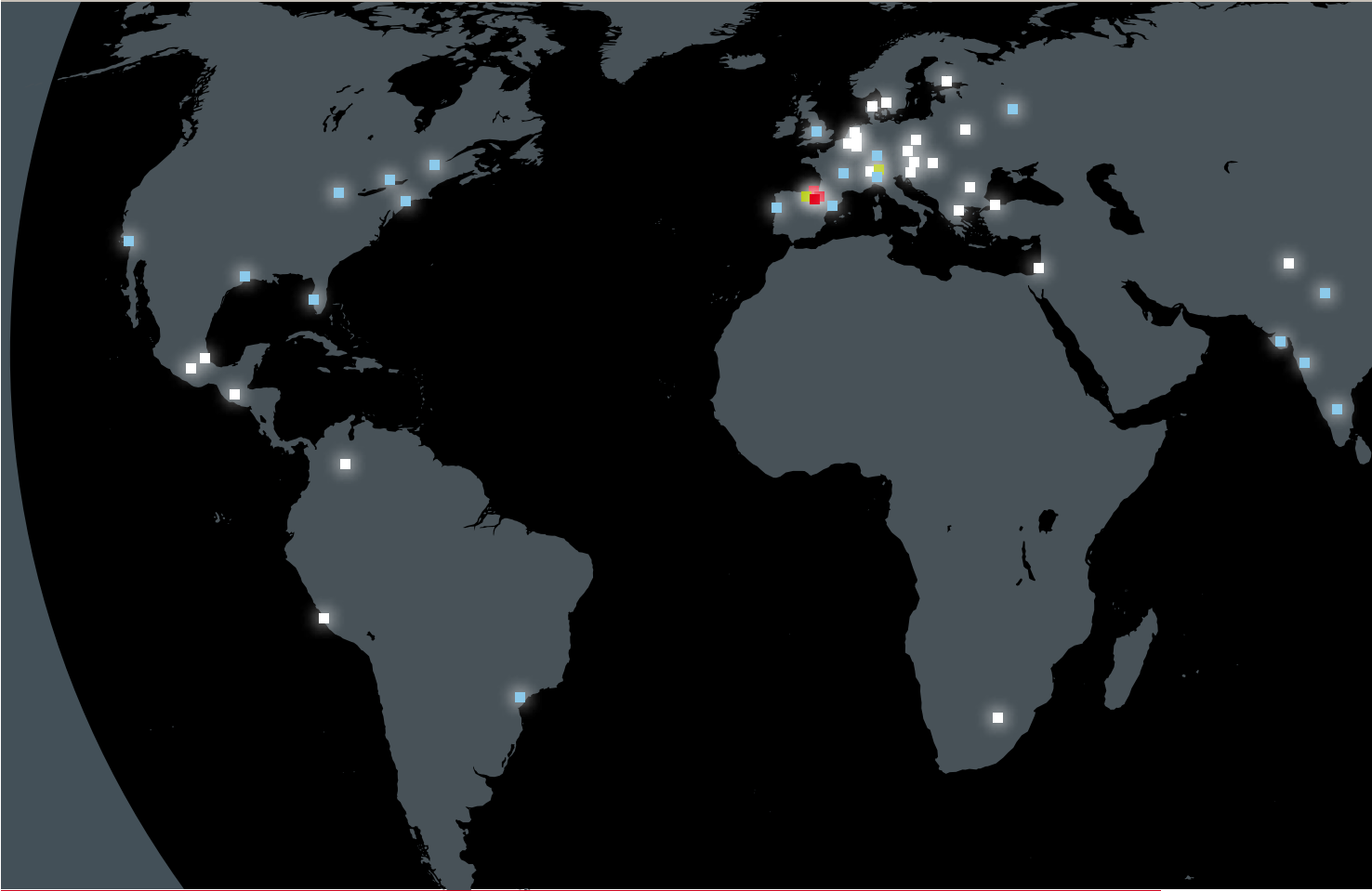
A unique integrated platform for all your needs

FAGOR AUTOMATION's unique integrated platform brings together every electronic element of your machine- the CNC , digital servo motors and drives, linear and angular feedback and ensures seamless integration, guaranteeing robust machine design and extreme performance to obtain maximum efficiency.

These elements working in perfect harmony and intelligently selecting and executing the machining algorithms to exceed user's expectations – EVERYTIME.



Global support network



We'll assist you wherever you are

Our worldwide network ensures quick response time to any technical support you may require with our products at any time.

Our global network consists of more than 30 branch offices and 40 distributors.

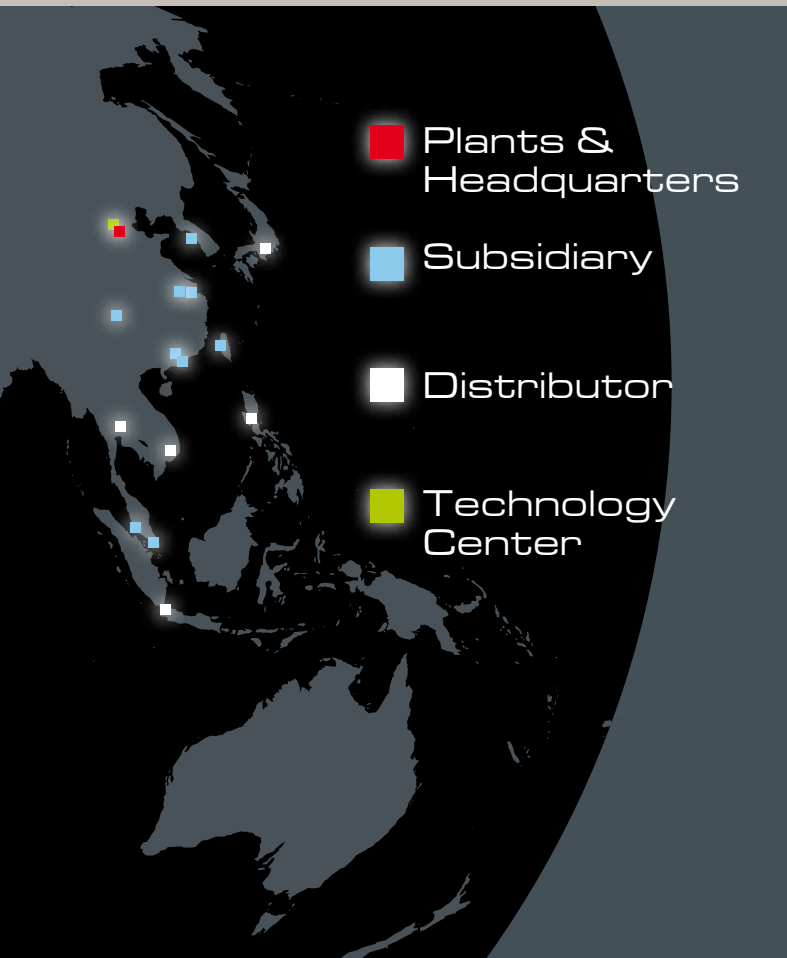


Continuous innovation to meet our customer's needs

A major part of FAGOR AUTOMATION's successful history is due to our constant investment commitment in company's infrastructure and R&D+i (Research, Development and innovation). This allows us to continuously develop leading products for the marketplace.

FAGOR AUTOMATION's technical center, called AOTEK has also jointly participated with other domestic and international research centers and universities on many prestigious technical projects like

FAGOR AUTOMATION has broadened its R&D+i resource and infrastructure base with the opening of two new application centers, one in Ivrea (Italy) and the other in Beijing (China). POWER-OM, ReBORN, CHAMELEON and IMPELER etc.



■ Plants & Headquarters

■ Subsidiary

■ Distributor

■ Technology Center



Personalized attention

FAGOR AUTOMATION works in close conjunction with their customers ensuring the best solution for each and every application.

A team of highly qualified technical experts from FAGOR AUTOMATION will work alongside the customer during the setup of the machine, to ensure product performance is maximized and to assist with the various adjustments procedures and settings to achieve an optimum machining operation.



Unparalleled commitment to customer support

In a more and more competitive world the machine down time is expensive and hence it is critical to partner with an organization which values customer support as its highest priority.

FAGOR AUTOMATION offers high quality pre and post sales assistance through qualified personnel to meet all your requirements.

Services contemplated for the smart factory

FAGOR has extended the conceptual Service limits and has adapted such to the reality of Industry 4.0, by enhancing performance, reducing errors and incidents and by contributing greater value to the machines throughout their entire life cycle. For this, we employ "smart maintenance" and predictive maintenance tools.

Our services are tailored to the needs of customers, either being oriented towards optimizing production or extending the life of the assets.



FAGOR AUTOMATION

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Fagor Automation holds the ISO 9001
 Quality System Certificate and the
 CE Certificate for all products manufactured.

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